provoke profound interest. The soils and geological engineers too will find many worth-while chapters affording a stimulating and instructive background to their own specialties in relationship to highway work. The layman and the legislator alike would profit by an examination of the book and gain thereby an appreciation of the problems involved in highway construction and the great progress made, especially in the past 35 years.

ARTHUR B. CLEAVES
Department of Geology and Geological Engineering, Washington University

Clinical Aspects of the Autonomic Nervous System. L. A. Gillilan. Little, Brown, Boston. xii + 316 pp. Illus. $6.50.

This book is intended to furnish a summary of the knowledge of the anatomy and physiology of the autonomic nervous system as a background for clinical practice. This purpose is not achieved, because, whereas the anatomical summary is adequate, particularly with regard to gross anatomy, the physiological data and theories are presented incompletely, deficiently, and often erroneously.

As examples of these errors I mention the statement (p. 161) that "certain tissue products such as acetylcholine and histamine . . . produce generalized vasodilation of coronary and peripheral vessels," coupled with the further statement that "epinephrine and ephedrine are peripheral vasoconstrictors and coronary vasodilators." Although the chemical mediation of coronary vasodilators and constrictors has not been unanimously settled, there is unanimous agreement that either acetylcholine or adrenaline leads to constriction. As another example I quote the statement (pp. 20–21) that "it is believed that mass release of acetylcholine at the myoneural junction brings about generalized contraction of the voluntary musculature." High concentrations of acetylcholine lead to paralysis, not to contractions.

In the classification of autonomic disturbances and body types, the author accepts the now generally discarded criterions of Eppinger and Hess, of Danielopolu, and of Martinet (not quoted in the bibliography) of sympathicotonia, amphotonia, and vagotonia. I fail to find "a striking parellelism" between this classification and all the others grouped in Table 1.

A salient flaw in the book is a striking negligence to give appropriate credit to many investigators and the giving of undue credit to others. Thus, I disagree with the assertion that "the autonomic nervous system got its first firm footing in medicine when Peet (1935) devised his operation for relief of hypertension." The basis of our knowledge of the chemical transmission of nerve impulses is Loewi's study of the heart, not Dale's work on acetylcholine. The generally accepted theory of hunger was proved by Cannon and Washburn (1912), not by Carlson. The role of the sympatho-adrenal system in emotions was not an "obvious" anonymous contribution (p. 84); it was first emphasized and later beautifully analyzed by Cannon.

ARTURO ROSENBLUETH
Department of Physiology, National Institute of Cardiology of Mexico

Rural Electrification. vols. I and II. United Nations Economic and Social Council, Geneva, Switz., 1954. vol. I, ii + 163 pp. + tables. Plates. Paper, $1.50. vol. II, ii + 165 pp. Plates. Paper, $1.25. (U.S. distrib.: Columbia Univ. Press, New York.)

This two-volume work, representing the collective rural electrification experience of 14 nations, is an excellent compendium of modern knowledge in this specialized field. The material is admirably organized to accomplish its avowed purposes of (i) making available to relatively less industrialized nations the special techniques that have proved successful in bringing central station electric service to farms throughout the world, and (ii) providing nations already advanced in rural electrification with a means of measuring their own techniques and progress against the achievements of the rest of the world. In addition, a diversified pool of knowledge is made available for the benefit of all nations.

The material is not limited to discussions of broad principles. Its value is not curtailed by any attempt to avoid technical terminology or mathematical analysis where these are applicable. The volumes are well worth study by any agency responsible for initiating, redeveloping, or expanding a national or regional rural electrification program. Volume I provides specific details on proved principles of design applicable to network planning, rural distribution facilities, and small local thermal and hydroelectric generating stations. There is also considerable specific data covering experience with respect to cost and rate structure design.

The early rural electric system design engineers pioneered new construction standards and techniques in order to reduce line construction costs to a point where the relatively sparsely settled rural areas could be economically served. In this endeavor, mistakes were, of course, made in both electrical and mechanical construction practices. These mistakes effectively increased the cost of original facilities in many instances. Present-day higher price levels make it almost mandatory that these early mistakes not be repeated, and a careful review of the comprehensive experience of 14 nations well established in the technology will be of great advantage to present designers in striking an optimum balance between low initial costs on one hand and reasonable maintenance charges and flexibility for growth on the other.

One of the very few faults of the work is the absence of an index and a consequent inability to locate material on specific topics without excessive thumbing. This lack is somewhat compensated for in volume II by the inclusion of a table of contents with chap-

ters subdivided according to process designation, that is, milk production, poultry production, pig rearing, fruit handling, and so forth.

Volume II is completely devoted to the application of central station electric service to nearly every branch of agricultural activity and contains a tremendous quantity of valuable empirical data, design information, and specifications on the sizes of electric loads imposed by the variety of farm chores susceptible to performance by electric methods. Volume II is a classic in the field of what is generally known as "power use"—an activity that includes all endeavor designed to develop additional load for electric systems serving rural areas.

CHARLES A. ROBINSON, JR.
National Rural Electric Cooperative Association

Reports on Progress in Physics. vol. XVII (1954). A. C. Stickland, Exec. Ed. Physical Society, London, 1954. 280 pp. Illus. £2 10s.

This volume, like the preceding ones, is remarkable because of the wide range of problems discussed. M. H. L. Pryce (now at Bristol) treats a subject that is of great interest to all theoretical and experimental nuclear physicists—the nuclear shell model. The theory of the origin of the cosmic ray is discussed by Edward Teller (University of California, Berkeley), showing that the random acceleration process (Fermi) and location of the accelerating fields in radio stars (Unsöld) can account for the main features of cosmic radiation. Solid-state physics is represented by the article on Antiferromagnetism, by A. E. Lidiard (Berkeley, Calif.). Readers interested in the properties of the various compounds in which antiferromagnetism has been observed will welcome the table (p. 240) that summarizes the various properties that have been studied and how they are related to antiferromagnetic structure. Chemical physics is represented by "Atomic valence states and chemical binding," by W. Moffitt (Harvard).

Atmospheric electricity was reviewed by J. Alan Chalmers (London). This is welcome, since much new work in this field has been carried out in recent years. It would have been even more interesting if this article had been illustrated. C. W. Allen (University of London Observatory), in his discussion of the physical condition of the solar corona, touches on problems that are of interest not only to astrophysicists but also to the physicists interested in "plasma physics" (gaseous discharges and high-temperature physics).

Investigation in the ionosphere is a field of physics that is particularly well supported in England and the paper on the horizontal movements in the ionosphere, discussed by E. H. Briggs and M. Spencer of the Cavendish Laboratory in Cambridge, is a valuable contribution to our knowledge on ionosphere movements based on radio methods.

Microwave investigations during the war have stimulated interest in the solution of the classical diffraction problem. This work, which was, among others, developed by Bethe, Schwinger, and their collaborators in this country, by Meixner and Buchholz in Germany, and by the author in Holland, is presented in a masterly summary with over 500 references, by C. J. Bouwkap (Philips Research Laboratories, Eindhoven, Netherlands).

KARL LARK-HOROVITZ
Department of Physics, Purdue University

The Identification of Organic Compounds. A manual of qualitative and quantitative methods. Stig Veibel. Gad, Copenhagen, ed. 4 (1st Eng. ed.), 1954. xv + 346 pp. Illus.

Three Danish editions have preceded the present English language edition of this well-constructed, up-to-date manual on the identification of organic compounds. Here are combined in one convenient volume the qualitative and quantitative aspects of the subject. The first three chapters deal with purification and determination of physical properties, detection and estimation of the elements, and solubility tests. The remainder of the book offers a wide and critical selection of the available methods for detection and quantitative determination of all the principal functional groups and for identification of organic compounds through derivatives. Only in the treatment of aromatic hydrocarbons do I feel that the book falls short.

The manual was originally prepared for use at the University of Copenhagen and the University of Technology of Copenhagen by students who were devoting about 40 (5-hour) working days to the course on identification. Designed for the mature student, it does not provide lists of compounds and derivatives found in many treatments of qualitative organic analysis. Instead, the student is referred to Beilstein and the abstract literature and is provided with references to papers in which melting points of derivatives are given. All specific procedures are documented, and the author, whose contributions to the original analytic literature have been ample and varied, adds valuable experience from his own laboratories to the documentation. He does not lead the student by the hand; moreover, he permits the student to realize, through brief documented discussions, that a variety of methods are often available for studying any one functional group, and that he need not restrict himself to the recommended procedures that are described in detail in the manual. The total approach can only develop a sound understanding of the problems involved in identification.

Few of our colleges and universities offer integrated courses of the type for which this manual is written. However, anyone planning to institute such a course could well consider this neat, succinct, but comprehensive, treatment.

FRANCES BERLINER
Department of Chemistry, Bryn Mawr College